

## WHAT ARE MOTHBALLS?

Mothballs have been used for many years in the United States as an insect and pest repellent for natural fibers, especially wool. Naphthalene was first registered as a pesticide in the United States in 1948. The State of Florida has registered approximately 400 moth/clothing related products.

Most of these products contain the active ingredients naphthalene, although some still remain in the market that contain para-dichlorobenzene. Both active ingredients are effective because they vaporize at room temperature.

Mothballs are commercially available in solid formulations such as balls (like marbles), flakes, cakes, crystals, blocks, scented packets and cases. They have a very strong odor that smells like camphor.

## HOW ARE MOTHBALLS INTENDED TO BE USED?

The fumes from mothballs kill clothes moths, their eggs and larvae that eat natural fibers in indoor storage areas, such as closets, attics and basements.



Clothing Moth (*Tineola bisselliella*)

Mothballs are not intended to be used outdoors. The active ingredients can contaminate water and soil, harm wildlife, and contribute to air pollution.

## WHAT ARE THE POSSIBLE ROUTES OF EXPOSURE?

- **Dermal** - Through direct contact with skin.
- **Respiratory** - By breathing in vapors.
- **Ingestion** - Through accidental consumption or failing to wash your hands after handling moth-balls and then handling food.

## MOTHBALL EXPOSURE HEALTH EFFECTS

Health effects from mothballs depend on the active ingredient and the type of exposure. When used according to label directions, no significant health effects are expected. Symptoms will vary with the type of exposure to mothballs. Individuals exposed to mothball vapors containing naphthalene may experience headaches, nausea, dizziness, respiratory irritation, blood effects and eye effects. Dermal exposure symptoms include irritation and burning of the skin, or possible allergic reactions with repeated exposures.

Vapor or dust exposure to 1,4-dichlorobenzene at very high concentrations may cause irritation of the eyes and respiratory tract, upset stomach, liver and kidney damage and effects on the nervous system. Long-term ingestion of 1,4-dichlorobenzene may adversely affect blood cells and liver function. Some animal studies indicate that both active ingredients may have carcinogenic potential with long-

term, high level exposure.

## ARE CHILDREN MORE VULNERABLE TO MOTHBALL POISONING?

Mothballs present a challenge for users and parents since many products are shaped and colored like food or candy and thus are attractive to children. Children may also be exposed as a result of clothing, diapers and bedding that has been stored with mothballs. In addition, certain populations of children appear to be more susceptible to developing anemia, jaundice and kidney damage (due to the destruction of red blood cells) following exposure to mothballs. This sensitivity is due to a decreased ability of these children to rid their body of naphthalene metabolites.



## HEED IMPORTANT PRECAUTIONS FOUND ON MOTHBALLS PESTICIDE LABELS

Following the label instructions will not only limit or reduce exposure to these pesticides, but will control the pest more effectively. The label is a legal document and its instructions must be followed accordingly. If you do not understand the instructions found on pesticide labels, please find someone who can explain them to you, or contact your local University Extension Office Agent for further assistance. The following tips will help you understand mothballs pesticide labels:

1. Use only the amounts recommended on the label by following its instructions. Make sure the pesticide is used according to volume of the area to be treated. When volume is not known it can be calculated by using the following formula:  
(height x width x depth of the space)

*More is not better!*

2. Follow post-application instructions to prevent fumes from drifting to non-target areas.
3. Mothball product labels contain instructions for treating articles by placing mothballs in an airtight space, such as a garment bag or well sealed container for a determined period of time. Unfortunately, mothballs are sometimes improperly used in

locations not listed on labels such as: attics, walls, voids, crawl spaces, gardens, trash cans, vehicles, or in open closets, or plastic garbage bags. These uses are a violation of the label and are illegal.

4. Mothballs sometimes are used illegally to repel pests not listed on labels. Some of these “off-label pests” include: squirrels, skunks, deer, mice, rats, and snakes, among others animals. Use mothballs pesticide products to control the pests listed on the label only! Outdoor use of mothballs is also a violation of the label.

Remember mothballs are not legal for use as snake repellents!

5. Follow storage and disposal instructions on moth control pesticides.

### ARE MOTHBALLS PESTICIDES?

Mothballs are pesticides regulated by the United States Environmental Protection Agency (EPA) and in Florida by the Florida Department of Agriculture and Consumer Services (FDACS). All pesticides sold in Florida must be registered by FDACS and must be used according to label instructions.

Each year, FDACS investigates many complaints involving the improper use of mothballs. The majority of these cases involve the illegal use of mothballs outdoors to repel snakes, squirrels, moles, dogs, and other animals; often these misuses affect neighbors or bystanders who become exposed to the mothball vapors.

Additionally, naphthalene-based mothball products are sometimes illegally imported without federal or state evaluation of the products’ content and labeling. Some of these products, especially those manufactured in various colors, pose a special risk to children as they have a candy-like appearance.

Remember that use of a pesticide not in accordance with the label is a violation of the Florida Pesticide Law. Violators may be subject to administrative action, which includes fines up to \$10,000 per violation. In addition, those misusing pesticides may be subject to the penalty provisions of the Federal Insecticide, Fungicide, and Rodenticide Act, administered by the EPA.

### A FEW TIPS ON USING MOTHBALLS SAFELY:

- Use only tightly sealed bags or other containers to prevent vapors from escaping into occupied rooms or cabinets.
- Wash and/or air out treated fabrics before use (especially children’s clothing).
- Store only in the original container in a cool, dry place inaccessible to children and pets.
- Do not place unused mothballs down indoor or outdoor drains.

If you need further information about the proper use of mothballs, please contact the sources below. If someone has accidentally swallowed mothballs, call 911.

### CONTACT INFORMATION

- **FDACS Pesticide Compliance:**  
(850) 617-7880
- **National Pesticide Information Center:**  
1-800-858-7378  
(7:30 AM-3:30 PM PST) or  
E-mail at [npic@ace.orst.edu](mailto:npic@ace.orst.edu)
- **Poison Control Center:**  
1-800-222-1222
- **Florida Department of Health  
Bureau of Epidemiology,  
Pesticide Surveillance Program**  
1-800-606-5810

**Florida Department of Agriculture  
and Consumer Services  
The Conner Building  
3125 Conner Blvd.  
Tallahassee, Florida 32399  
(850) 617-7850**



FDACS-P-01860

# FACTS ABOUT MOTHBALLS

## What You Should Know



Florida Department of  
Agriculture and Consumer Services

Adam H. Putnam, Commissioner